

Ying Tan

Fireworks Algorithm

A Novel Swarm Intelligence
Optimization Method

 Springer

Fireworks Algorithm A Novel Swarm Intelligence Optimization Method

Ying Tan, KAY CHEN TAN



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Fireworks Algorithm Ying Tan, 2015-10-11 This book is devoted to the state of the art in all aspects of fireworks algorithm FWA with particular emphasis on the efficient improved versions of FWA It describes the most substantial theoretical analysis including basic principle and implementation of FWA and modeling and theoretical analysis of FWA It covers exhaustively the key recent significant research into the improvements of FWA so far In addition the book describes a few advanced topics in the research of FWA including multi objective optimization MOO discrete FWA DFWA for combinatorial optimization and GPU based FWA for parallel implementation In sequels several successful applications of FWA on non negative matrix factorization NMF text clustering pattern recognition and seismic inversion problem and swarm robotics are illustrated in details which might shed new light on more real world applications in future Addressing a multidisciplinary topic it will appeal to researchers and professionals in the areas of metaheuristics swarm intelligence evolutionary computation complex optimization solving etc

Handbook of Research on Fireworks Algorithms and Swarm Intelligence Tan, Ying, 2019-12-27 In recent years swarm intelligence has become a popular computational approach among researchers working on optimization problems throughout the globe Several algorithms inside swarm intelligence have been implemented due to their application to real world issues and other advantages A specific procedure Fireworks Algorithm is an emerging method that studies the explosion process of fireworks within local areas Applications of this developing program are undiscovered and research is necessary for scientists to fully understand the workings of this innovative system The Handbook of Research on Fireworks Algorithms and Swarm Intelligence is a pivotal reference source that provides vital research on theory analysis improvements and applications of fireworks algorithm While highlighting topics such as convergence rate parameter applications and global optimization analysis this publication explores up to date progress on the specific techniques of this algorithm This book is ideally designed for researchers data scientists mathematicians engineers software developers postgraduates and academicians seeking coverage on this evolutionary computation method

Critical Developments and Applications of Swarm Intelligence Shi, Yuhui, 2018-02-28 Artificial intelligence is a constantly advancing field that requires models in order to accurately create functional systems The use of natural acumen to create artificial intelligence creates a field of research in which the natural and the artificial meet in a new and innovative way Critical Developments and Applications of Swarm Intelligence is a critical academic publication that examines developing research technologies and function regarding natural and artificial acumen specifically in regards to self organized systems Featuring coverage on a broad range of topics such as evolutionary algorithms optimization techniques and computational comparison this book is geared toward academicians students researchers and engineers seeking relevant and current research on the progressive research based on the implementation of swarm intelligence in self organized systems

Handbook of Research on Advancements of Swarm Intelligence Algorithms for Solving Real-World Problems

Cheng, Shi, Shi, Yuhui, 2020-04-24 The use of optimization algorithms has seen an emergence in various professional fields due to its ability to process data and information in an efficient and productive manner Combining computational intelligence with these algorithms has created a trending subject of research on how much more beneficial intelligent inspired algorithms can be within companies and organizations As modern theories and applications are continually being developed in this area professionals are in need of current research on how intelligent algorithms are advancing in the real world The Handbook of Research on Advancements of Swarm Intelligence Algorithms for Solving Real World Problems is a pivotal reference source that provides vital research on the development of swarm intelligence algorithms and their implementation into current issues While highlighting topics such as multi agent systems bio inspired computing and evolutionary programming this publication explores various concepts and theories of swarm intelligence and outlines future directions of development This book is ideally designed for IT specialists researchers academicians engineers developers practitioners and students seeking current research on the real world applications of intelligent algorithms **Advances in Swarm Intelligence** Ying

Tan, Yuhui Shi, Qirong Tang, 2018-06-15 The two volume set of LNCS 10941 and 10942 constitutes the proceedings of the 9th International Conference on Advances in Swarm Intelligence ICSI 2018 held in Shanghai China in June 2018 The total of 113 papers presented in these volumes was carefully reviewed and selected from 197 submissions The papers were organized in topical sections as follows theories and models of swarm intelligence ant colony optimization particle swarm optimization artificial bee colony algorithms genetic algorithms differential evolution fireworks algorithms bacterial foraging optimization artificial immune system hydrologic cycle optimization other swarm based optimization algorithms hybrid optimization algorithms multi objective optimization large scale global optimization multi agent systems swarm robotics fuzzy logic approaches planning and routing problems recommendation in social media prediction classification finding patterns image enhancement deep learning *Nature-Inspired Computing: Concepts, Methodologies, Tools, and Applications* Management

Association, Information Resources, 2016-07-26 As technology continues to become more sophisticated mimicking natural processes and phenomena also becomes more of a reality Continued research in the field of natural computing enables an understanding of the world around us in addition to opportunities for man made computing to mirror the natural processes and systems that have existed for centuries Nature Inspired Computing Concepts Methodologies Tools and Applications takes an interdisciplinary approach to the topic of natural computing including emerging technologies being developed for the purpose of simulating natural phenomena applications across industries and the future outlook of biologically and nature inspired technologies Emphasizing critical research in a comprehensive multi volume set this publication is designed for use by IT professionals researchers and graduate students studying intelligent computing **Intelligent System Design**

Based on Soft Computing Models Oscar Castillo, Patricia Melin, 2025-10-02 This book comprises a collection of papers focused on intelligent systems based on soft computing techniques In this book new directions on intelligent system design

based on soft computing models such as fuzzy logic neural networks and optimization algorithms as well as their hybrid combinations are offered In addition the above mentioned methods are discussed in application areas such as control and robotics pattern recognition medical diagnosis decision making prediction and optimization of complex problems There are a group of papers with the main theme of type 1 type 2 and type 3 fuzzy logic which basically consists of papers that propose new concepts and algorithms based on type 1 type 2 and type 3 fuzzy logic and their applications There is also a set of papers that offer theoretical concepts and applications of meta heuristics in different areas There are also some papers that present theory and practice of neural networks in different applications Finally there are papers that offer theory and practice of optimization and evolutionary algorithms in different application areas

Advances in Swarm Intelligence

Ying Tan, Yuhui Shi, Ben Niu, 2016-09-05 This two volume set LNCS 9712 and LNCS 9713 constitutes the refereed proceedings of the 7th International Conference on Swarm Intelligence ICSI 2016 held in Bali Indonesia in June 2016 The 130 revised regular papers presented were carefully reviewed and selected from 231 submissions The papers are organized in 22 cohesive sections covering major topics of swarm intelligence and related areas such as trend and models of swarm intelligence research novel swarm based optimization algorithms swarming behaviour some swarm intelligence algorithms and their applications hybrid search optimization particle swarm optimization PSO applications ant colony optimization brain storm optimization fireworks algorithms multi objective optimization large scale global optimization biometrics scheduling and planning machine learning methods clustering algorithm classification image classification and encryption data mining sensor networks and social networks neural networks swarm intelligence in management decision making and operations research robot control swarm robotics intelligent energy and communications systems and intelligent and interactive and tutoring systems

Advances in Swarm Intelligence

Ying Tan, Hideyuki Takagi, Yuhui Shi, 2017-07-18 The two volume set of LNCS 10385 and 10386 constitutes the proceedings of the 8th International Conference on Advances in Swarm Intelligence ICSI 2017 held in Fukuoka Japan in July August 2017 The total of 133 papers presented in these volumes was carefully reviewed and selected from 267 submissions The paper were organized in topical sections as follows Part I theories and models of swarm intelligence novel swarm based optimization algorithms particle swarm optimization applications of particle swarm optimization ant colony optimization artificial bee colony algorithms genetic algorithms differential evolution fireworks algorithm brain storm optimization algorithm cuckoo search and firefly algorithm Part II multi objective optimization portfolio optimization community detection multi agent systems and swarm robotics hybrid optimization algorithms and applications fuzzy and swarm approach clustering and forecast classification and detection planning and routing problems dialog system applications robotic control and other applications

Advances in Swarm Intelligence

Ying Tan, Hideyuki Takagi, Yuhui Shi, Ben Niu, 2017-07-18 The two volume set of LNCS 10385 and 10386 constitutes the proceedings of the 8th International Conference on Advances in Swarm Intelligence ICSI 2017 held in Fukuoka Japan in July August 2017 The total

of 133 papers presented in these volumes was carefully reviewed and selected from 267 submissions. The papers were organized in topical sections as follows: Part I: theories and models of swarm intelligence; novel swarm based optimization algorithms; particle swarm optimization; applications of particle swarm optimization; ant colony optimization; artificial bee colony algorithms; genetic algorithms; differential evolution; fireworks algorithm; brain storm optimization algorithm; cuckoo search and firefly algorithm. Part II: multi objective optimization; portfolio optimization; community detection; multi agent systems and swarm robotics; hybrid optimization algorithms and applications; fuzzy and swarm approach; clustering and forecast; classification and detection; planning and routing problems; dialog system applications; robotic control and other applications.

Advances in Swarm Intelligence Ying Tan, KAY CHEN TAN, 2010-06. The books LNCS 6145 and 6146 constitute the refereed proceedings of the International Conference on Swarm Intelligence ICSI 2010 held in Beijing, China, in June 2010. The 185 revised full papers presented were carefully reviewed and selected from 394 submissions. The papers are organized in topical sections on: theoretical analysis of swarm intelligence algorithms; PSO algorithms; applications of PSO algorithms; ACO algorithms; applications of ACO algorithms; artificial immune system; novel swarm based optimization algorithms; genetic algorithms; evolutionary computation; hybrid algorithms; multi objective optimization algorithms; multi robot systems; multi agent based complex systems; part I and fuzzy methods; applications of computational intelligence algorithms; signal processing and information security; information processing system; intelligent control; classifier systems; machine learning methods; other optimization algorithms; data mining methods; intelligent computing methods and applications; data mining algorithms and applications; other applications; part II.

Hybrid Competitive Learning Method Using the Fireworks Algorithm and Artificial Neural Networks Fevrier Valdez, Juan Barraza, Patricia Melin, 2023-11-25. This book focuses on the fields of neural networks, swarm optimization algorithms, clustering, and fuzzy logic. This book describes a hybrid method with three different techniques of intelligence computation: neural networks, optimization algorithms, and fuzzy logic. Within the neural network techniques, competitive neural networks (CNNs) are used for the optimization algorithms technique; we used the fireworks algorithm (FWA) and in the area of fuzzy logic, the Type 1 Fuzzy Inference Systems (T1FIS) and the Interval Type 2 Fuzzy Inference Systems (IT2FIS) were used with their variants of Mamdani and Sugeno type respectively. FWA was adapted for data clustering with the goal to help of competitive neural network to find the optimal number of neurons. It is important to mention that two variants were applied to the FWA: dynamically adjust of parameters with Type 1 Fuzzy Logic (FFWA) as the first one and Interval Type 2 (F2FWA) as the second one. Subsequently, based on the outputs of the CNN and with the goal of classification data, we designed Type 1 and Interval Type 2 Fuzzy Inference Systems of Mamdani and Sugeno type. This book is intended to be a reference for scientists and engineers interested in applying a different metaheuristic or an artificial neural network in order to solve optimization and applied fuzzy logic techniques for solving problems in clustering and classification data. This book is also used as a reference for

graduate courses like the following soft computing swarm optimization algorithms clustering data fuzzy classify and similar ones We consider that this book can also be used to get novel ideas for new lines of research new techniques of optimization or to continue the lines of the research proposed by the authors of the book

Advances in Swarm Intelligence Ying Tan, Yuhui Shi, Li Li, 2016-07-07 This two volume set LNCS 9712 and LNCS 9713 constitutes the refereed proceedings of the 7th International Conference on Swarm Intelligence ICSI 2016 held in Bali Indonesia in June 2016 The 130 revised regular papers presented were carefully reviewed and selected from 231 submissions The papers are organized in 22 cohesive sections covering major topics of swarm intelligence and related areas such as trend and models of swarm intelligence research novel swarm based optimization algorithms swarming behaviour some swarm intelligence algorithms and their applications hybrid search optimization particle swarm optimization PSO applications ant colony optimization brain storm optimization fireworks algorithms multi objective optimization large scale global optimization biometrics scheduling and planning machine learning methods clustering algorithm classification image classification and encryption data mining sensor networks and social networks neural networks swarm intelligence in management decision making and operations research robot control swarm robotics intelligent energy and communications systems and intelligent and interactive and tutoring systems

Advances in Swarm Intelligence Ying Tan, Yuhui Shi, Ben Niu, 2019-07-18 The two volume set of LNCS 11655 and 11656 constitutes the proceedings of the 10th International Conference on Advances in Swarm Intelligence ICSI 2019 held in Chiang Mai Thailand in June 2019 The total of 82 papers presented in these volumes was carefully reviewed and selected from 179 submissions The papers were organized in topical sections as follows Part I Novel methods and algorithms for optimization particle swarm optimization ant colony optimization fireworks algorithms and brain storm optimization swarm intelligence algorithms and improvements genetic algorithm and differential evolution swarm robotics Part II Multi agent system multi objective optimization neural networks machine learning identification and recognition social computing and knowledge graph service quality and energy management

New Advancements in Swarm Algorithms: Operators and Applications Erik Cuevas, Fernando Fausto, Adrián González, 2019-04-02 This book presents advances in alternative swarm development that have proved to be effective in several complex problems Swarm intelligence SI is a problem solving methodology that results from the cooperation between a set of agents with similar characteristics The study of biological entities such as animals and insects manifesting social behavior has resulted in several computational models of swarm intelligence While there are numerous books addressing the most widely known swarm methods namely ant colony algorithms and particle swarm optimization those discussing new alternative approaches are rare The focus on developments based on the simple modification of popular swarm methods overlooks the opportunity to discover new techniques and procedures that can be useful in solving problems formulated by the academic and industrial communities Presenting various novel swarm methods and their practical applications the book helps researchers lecturers engineers and practitioners solve

their own optimization problems *Swarm Intelligence* Ying Tan, 2018-10-05 Swarm Intelligence SI is one of the most important and challenging paradigms under the umbrella of computational intelligence. It focuses on the research of collective behaviours of a swarm in nature and or social phenomenon to solve complicated and difficult problems which cannot be handled by traditional approaches. Thousands of papers are published each year presenting new algorithms, new improvements and numerous real world applications. This makes it hard for researchers and students to share their ideas with other colleagues, follow up the works from other researchers with common interests and to follow new developments and innovative approaches. This complete and timely collection fills this gap by presenting the latest research systematically and thoroughly to provide readers with a full view of the field of swarm. Students will learn the principles and theories of typical swarm intelligence algorithms, scholars will be inspired with promising research directions and practitioners will find suitable methods for their applications of interest along with useful instructions **Swarm Intelligence** Ying Tan, 2018 This book discusses several swarm intelligence algorithms such as fireworks algorithm, predator-prey optimisation, ant lion optimiser, glowworm swarm optimisation, firefly algorithm, binary moth flame optimisation algorithm, binary whale optimisation, grey wolf optimisation, interactive chaotic evolution and inclined planes system optimisation GPU-based Parallel Implementation of Swarm Intelligence Algorithms Ying Tan, 2016-04-15 GPU based Parallel Implementation of Swarm Intelligence Algorithms combines and covers two emerging areas attracting increased attention and applications: graphics processing units (GPUs) for general purpose computing (GPGPU) and swarm intelligence. This book not only presents GPGPU in adequate detail but also includes guidance on the appropriate implementation of swarm intelligence algorithms on the GPU platform. GPU based implementations of several typical swarm intelligence algorithms such as PSO, FWA, GA, DE and ACO are presented and having described the implementation details including parallel models, implementation considerations as well as performance metrics are discussed. Finally, several typical applications of GPU based swarm intelligence algorithms are presented. This valuable reference book provides a unique perspective not possible by studying either GPGPU or swarm intelligence alone. This book gives a complete and whole picture for interested readers and new comers who will find many implementation algorithms in the book suitable for immediate use in their projects. Additionally, some algorithms can also be used as a starting point for further research. Presents a concise but sufficient introduction to general purpose GPU computing which can help the layman become familiar with this emerging computing technique. Describes implementation details such as parallel models and performance metrics so readers can easily utilize the techniques to accelerate their algorithmic programs. Appeals to readers from the domain of high performance computing (HPC) who will find the relatively young research domain of swarm intelligence very interesting. Includes many real world applications which can be of great help in deciding whether or not swarm intelligence algorithms or GPGPU is appropriate for the task at hand **Advances in Swarm Intelligence** Ying Tan, Yuhui Shi, Ben Niu, 2019-07-19 The two volume set of LNCS 11655 and 11656 constitutes the

proceedings of the 10th International Conference on Advances in Swarm Intelligence ICSI 2019 held in Chiang Mai Thailand in June 2019 The total of 82 papers presented in these volumes was carefully reviewed and selected from 179 submissions The papers were organized in topical sections as follows Part I Novel methods and algorithms for optimization particle swarm optimization ant colony optimization fireworks algorithms and brain storm optimization swarm intelligence algorithms and improvements genetic algorithm and differential evolution swarm robotics Part II Multi agent system multi objective optimization neural networks machine learning identification and recognition social computing and knowledge graph service quality and energy management *Advances in Swarm Intelligence* Ying Tan,Yuhui Shi,Milan Tuba,2020-07-12 This book constitutes the proceedings of the 11th International Conference on Advances in Swarm Intelligence ICSI 2020 held in July 2020 in Belgrade Serbia Due to the COVID 19 pandemic the conference was held virtually The 63 papers included in this volume were carefully reviewed and selected from 127 submissions The papers are organized in 12 cohesive topical sections as follows Swarm intelligence and nature inspired computing swarm based computing algorithms for optimization particle swarm optimization ant colony optimization brain storm optimization algorithm bacterial foraging optimization genetic algorithm and evolutionary computation multi objective optimization machine learning data mining multi agent system and robotic swarm and other applications

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